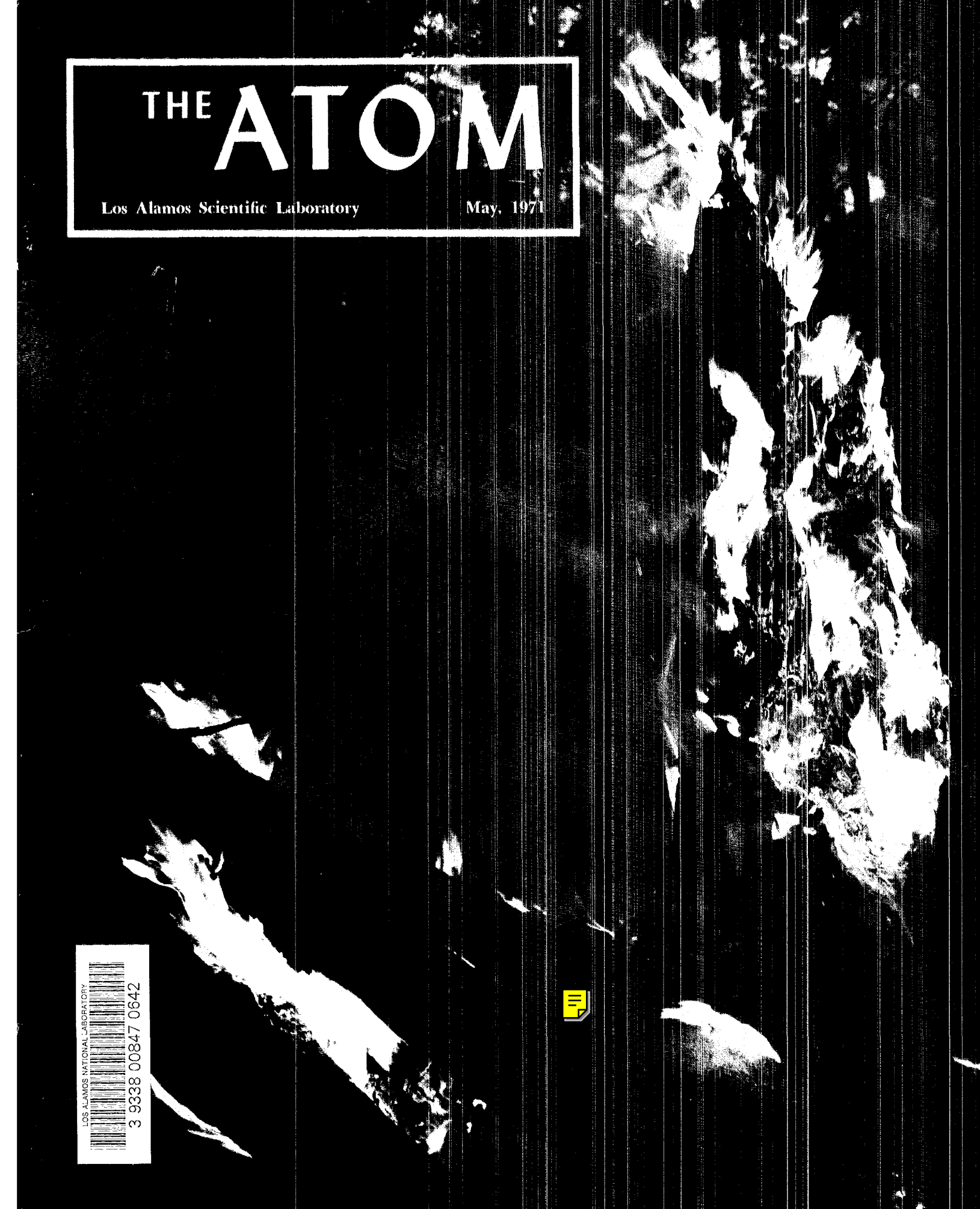
THE ATOM

Los Alamos Scientific Laboratory

May, 1971



Volume 8 Number 4
May, 1971

THE ATOM

Published by the University of California, Los Alamos Scientific Laboratory, Office of Public Information, P. O. Box 1663, Los Alamos, New Mexico 87544. Second Class Postage Paid at Los Alamos.

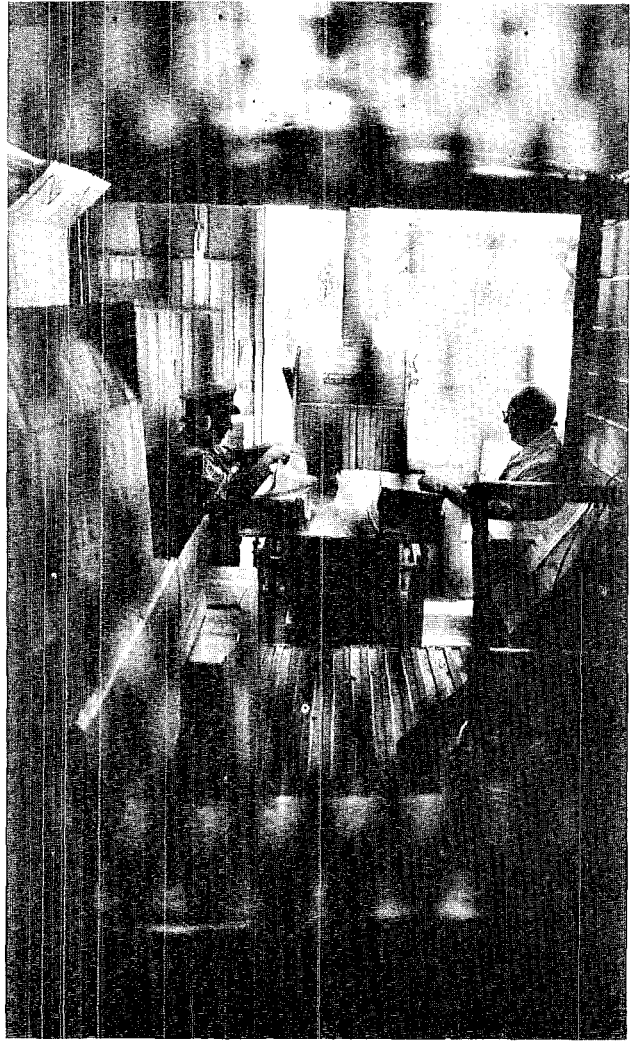
CONTENTS:

1 The Document Destructor
5 Pressing Hard at the Yearly Average
7 69 Proposals Submitted for Beam Time at LAMPF
9 Science Youth Days
14 LASL's Reduction in Force
16 LASL's Student Contingent at NMSU
20 Short Subjects
21 The Technical Side
24 20 Years Ago/What's Doing

Editor: Kenneth J. Johnson
Photography: Bill Jack Rodgers

Office: D-413 Administration Building. Telephone: 667-6102. Printed by The University of New Mexico Printing Plant, Albuquerque.

COVER:
This month's cover picture was taken during a forest fire 30 miles southwest of Los Alamos by ISD-7 Photographer Bill Jack Rodgers. More photographs and information about fire danger on the Santa Fe National Forest begin on page five.



A panel truck is almost empty of classified waste paper as Protective Force Sergeant Robert Herring and Jim Clow, administrative officer for the AEC's Protective Force in Los Alamos, demonstrate use of the new document destructor.

The Document Destructor

By Bill Richmond

Some four tons of classified waste paper are generated each week by the Los Alamos Scientific Laboratory--an average of two pounds per employee.

What to do with it presents a unique problem.

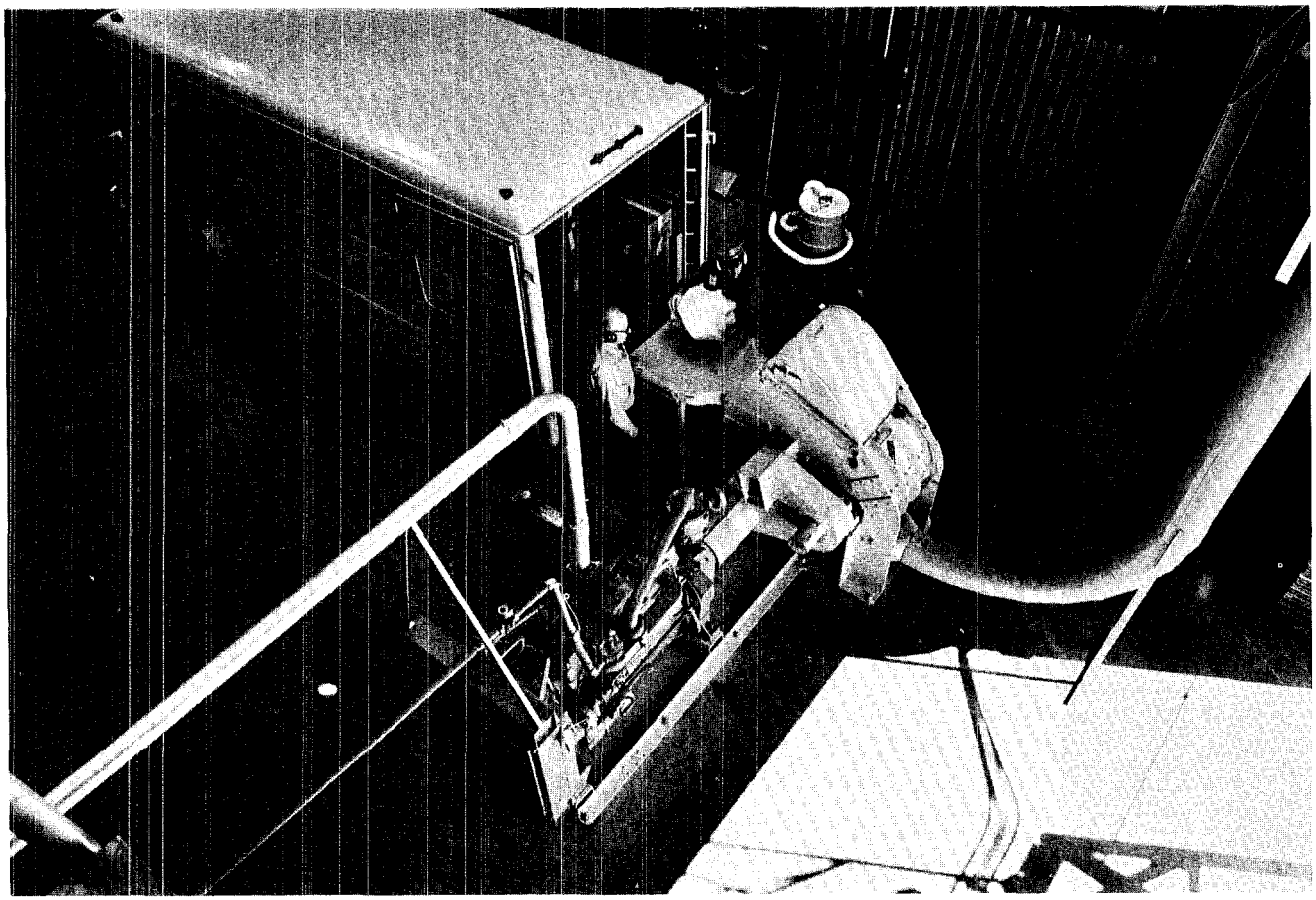
Being classified, it must be destroyed in such a manner that no information can be gleaned from the residue. Until just recently the only acceptable method of disposal was incineration. At Los Alamos two incinerators were operated around the clock in a vain effort to keep up with the paper. Long range projections indicated future volumes of approximately 10 tons per week could be expected. It was recognized that the acquisition of equipment to handle this volume was of prime importance. Pollution and environmental problems also had to be carefully considered.

The AEC made a detailed study of the existing market pertaining to such equipment as incinerators, grinders and pulpers, over an extended period of time. Other government agencies and contractors were queried and their procedures for destroying classified waste were carefully studied and analyzed. Special incinerators, including a rotating model, were observed and load tested. Finally a contract was negotiated with Document Disintegration, Inc., of Los Angeles, Calif., for the conditional procurement of a prototype hammermill, its purchase to be based on satisfactory performance during a 90-day test period. The test was successful and the contract completed early this year. The cost, including installation, was approximately $40,000.

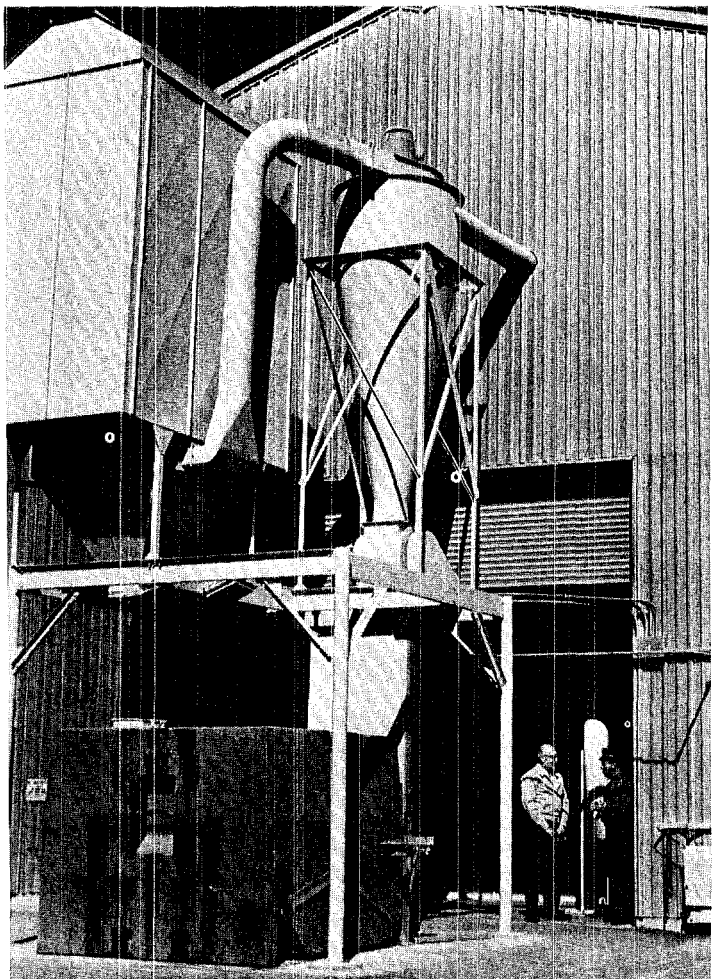
Jim Clow, administrative officer for the AEC's Protective Force in Los Alamos, says the new machine represents a double-pronged approach to the problem. "The destructor is a more efficient method of disposing of classified documents and also alleviates what could have been an environmental problem of air pollution." The Protective Force has the responsibility of destroying unwanted classified documents at LASL.

The Document Disintegrator is composed of three major sub-systems: (1) the hammermill powered by a large natural-gas engine, (2) pneumatic pulp-transporting system, and (3) residue

continued on page 3



The first of three major sub-systems making up the document destructor is the hammermill powered by a large natural-gas engine. A part of the pulp-transporting system is at right.



The pneumatic transporting system and residue disposal equipment are located outside the building at TA-52.

disposal equipment. The classified waste paper is loaded manually into the machine from a sorting table. It is then pulverized by dual rotating mills to a degree fine enough to pass through small diameter security screens into the pneumatic conveyer tube which terminates at a cyclonic separator. At the separator the pulp is precipitated, collected and packed in a Dempster Dumpster box. The Dumpster box is compatible to existing Zia operated trucking equipment for movement to the county sanitary landfill.

For collecting very fine dust, not precipitated in the cyclonic separator, exhaust air is filtered through a bag house—an array of oversize vacuum cleaner bags inverted so they may also be dumped into the Dumpster box by means of a mechanical shaker. All fittings are dust tight as an aid to environmental control of emissions. Safety surveys indicate that use of respirators by the operators is not required.

For fire protection reasons, extreme house-keeping standards are enforced to guard against any gradual accumulations of fine paper fibers in and around the premises. Cleanup is made after each operation. The noise level does constitute a problem in the immediate area of the equipment and operators are required to wear jet-aircraft-type ear muffs.

A Dumpster box holds about 1,800 pounds of residue which is approximately 45 boxes of classified waste paper at one cubic foot per box.

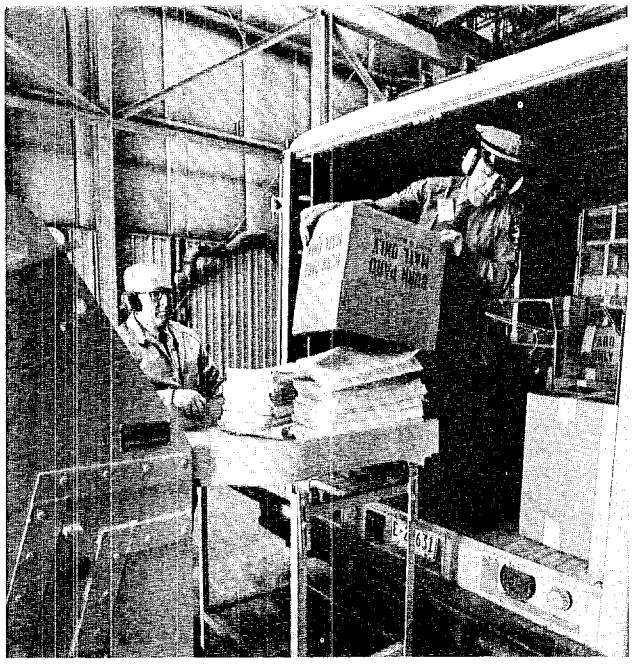
"All classified documents are now destroyed in this manner," Clow said, "except for top-secret data and microfilm which are still burned." Prior to burning, however, the microfilm as well as all photographic material containing silver is sent to Sandia Base in Albuquerque where the silver is reclaimed. Also, certain cryptographic material is disposed of by other means. Certain materials are still burned or destroyed by other means because security regulations require it.

The destructor/hammermill can handle 1,200 to 1,500 pounds of classified waste per hour.

"We average about six hours of operation per week now but there are no limitations, except for the capability of the machine, on what we could handle," Clow said. "It could be in operation almost continuously if necessary."

The maximum that could be burned in the two incinerators was about 1,000 pounds per day although the average was about 800 pounds per

continued on next page

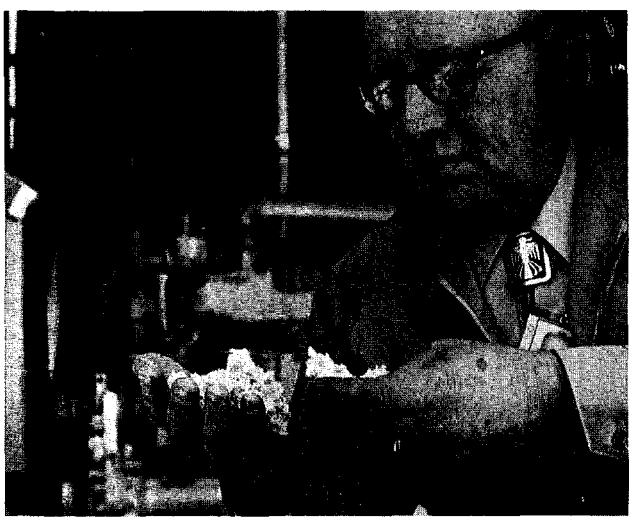


Herring dumps another box of classified waste paper onto the machine's sorting table.

Herring and Clow demonstrate how waste paper is fed into the document destructor.

Ellis Elze of the Protective Force makes from 80 to 100 stops a week to pick up classified waste paper.

Clow displays a fine residue—all that is left of paper after it has been cycled through the machine.



day. Some quick arithmetic shows the Laboratory was generating classified waste at a faster rate than it could be conveniently disposed of.

"It seemed like we were always behind," Clow said. "This was really the primary motive to start looking around for something new to do the job."

The large jump in the amount of classified waste paper was really caused by the increase in computer printouts from LASL's Central Computing Facility, Clow said. "The number of normal day-to-day classified documents has not greatly increased."

The destructor is capable of destroying entire books—two inches thick—plus metal, wood, plastic, film, mylar and other materials.

A member of the Protective Force, usually Inspector Ellis Elze, picks up the classified waste at a number of stops at the Laboratory including outlying sites. He makes 80-100 stops a week, according to Clow. The places providing the majority of this waste are Mail and Records, C-division, T-division, Graphic Arts and the Crypto Center, Clow said.

Elze then transports the material to the destructor facility located adjacent to the deactivated UHTREX building at TA-52. Elze and Sergeant Robert Herring, also of the Protective Force, are principally involved in operating the machine.

"This is a two-man operation at the hammermill," Clow says, "for safety and efficiency."

The Document Destructor at LASL is the first of its kind to be placed in commerical use. It is considered a prototype or pilot project for the AEC, other laboratories and other federal agencies, and is considered the most advanced method of classified waste destruction to date.

When asked about the possibility of reclaiming the paper residue for recycling, Clow said, "We are not doing this now because there is really not enough residue to make it profitable or efficient for a private company. However, there is some reclaiming of this residue on the West Coast and perhaps in the future it might be possible to do it here."

By whatever name—document disintegrator, destructor or hammermill—it seems to be doing an efficient job of destroying classified waste paper. At the same time, it is not contributing to atmospheric pollution.

Pressing Hard at the Yearly Average

The fifth man-caused fire in the Los Alamos area so far this year burned about 20 acres of timber.

By mid-April, foresters were mighty concerned about how dry it was. There had already been five man-caused fires since the beginning of the year in the Los Alamos area alone and the timberland burned in them was pressing hard at the Forest's yearly average.

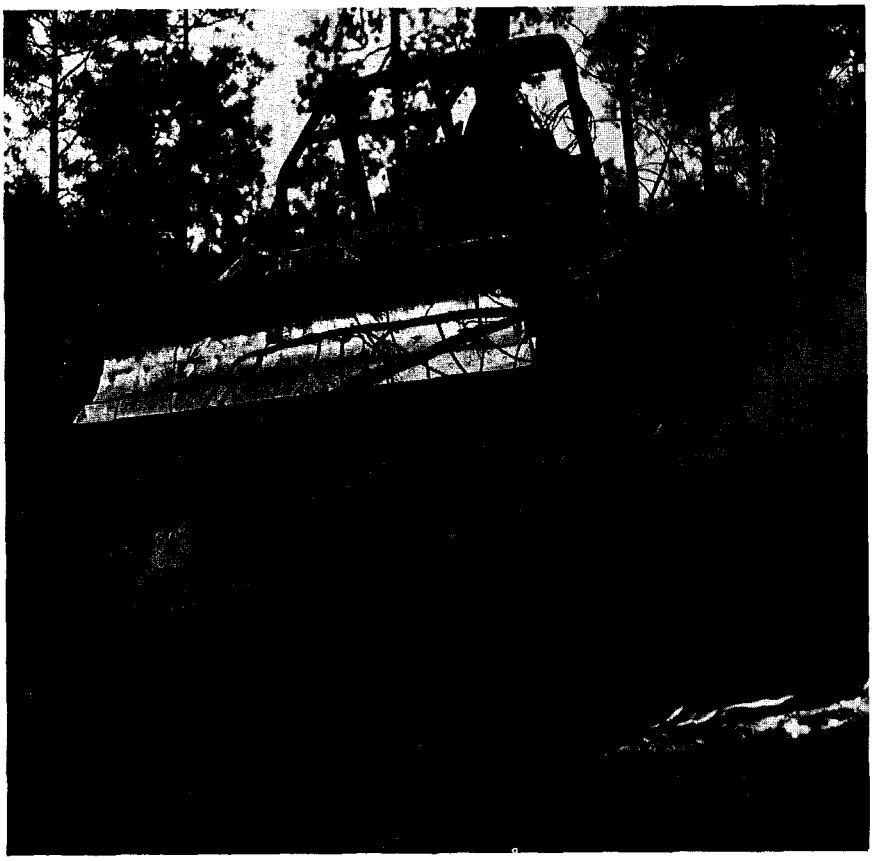
Then came the classic April showers and some unexpected snow, enough moisture to provide a couple of weeks of relief, barring carelessness on the part of smokers and campfire builders.

"When its dry most people understand they have to be careful about smoking and building campfires. But when we have some moisture on the ground they get a little complacent about these things," said Harry Severtson of the Santa Fe National Forest. "We urge people to be cautious about how they build their campfires, where they build them, and in smoking. When building a fire, they should use a fireplace grate such as those provided in Forest campgrounds. If one isn't available they should clear the duff down to mineral soil for at least three feet away from their campfire sites.

"The month of April was the dryest it's been this early in the year for many years. Fire danger built up a month earlier than usual. Our most extreme fire danger is usually in May and June. The season started in April this

continued on next page

A bulldozer cuts a firebreak to check advancing flames.



The fire near Redondo Campground, 30 miles southwest of Los Alamos, left behind the blackened skeletons of many young trees.

year, and we didn't expect much relief until the summer rains which usually start about mid-July."

Severtson said an average of about 50 acres of timberland are burned each year on the Santa Fe National Forest. Five man-caused fires in the Los Alamos area of the Forest alone destroyed about 35 acres by mid-April.

The most serious of the fires in the Los Alamos area so far this year was the last one. The fire started about 1 p.m. April 12 and was brought under control about 7 p.m. the same day. In that short span of time the fire destroyed about 20 acres of timberland near the Redondo Campground about 30 miles southwest of Los Alamos.

Jemez Springs Forest Ranger Fred Swetnam noted that in addition to personnel from the Santa Fe National Forest who fought the fire, there were about 20 members of the Southwest Fire Fighters organization from Santa Fe and Pecos, several transients and other volunteers from Jemez Springs, La Cueva, the New Mexico Timber Company, Bates Lumber Company, and Caldwell Lumber Company.

The ranger said no campground facilities or other Forest improvements were damaged by the blaze. "The fire burned a long, narrow strip that started under a rim near the campground and burned to the top of the mountain," he said.

Severtson noted the Forest rates the level of fire danger as *low, high or extreme.* "By mid-April the rating was *high* in the Santa Fe National Forest. Following the rain and snow we received, the rating was *low* and some campgrounds that were closed because of the fire danger were reopened. We have longer days now so the Forest dries out quicker. Wind will also pull out the moisture. Unless we get more rain or snow in the meantime, the Forest will be dry again."

69 Proposals Submitted for Beam Time at LAMPF

"None of us expected more than 15 to 20 proposals, but there were 69 and 13 letters of intent," said Louis Rosen, MP-division leader and director of the Los Alamos Meson Physics Facility (LAMPF).

Rosen was describing the reaction of members of LAMPF's Program Advisory Committee to the unexpected and overwhelming response by scientists throughout the United States and some foreign countries who were invited to submit research proposals for use of the accelerator facility.

Overall, the proposals represent the desires of more than 125 scientists to conduct experiments at the Meson Facility. Spokesmen for one-third of the proposals are from the Los Alamos Scientific Laboratory although about half of all proposals are in collaboration with LASL scientists. Spokesmen for the other two-thirds are members of the Users Group which is made up of scientists from colleges, universities and research laboratories throughout the United States and some foreign countries.

Geographically, more proposals were submitted from the Southwestern part of the country than any other. Including those from LASL, there were 38 from this area. From the Northeast there were 20; Northwest—three; and Southeast—eight.

One submission was from the University of Heidelberg, Germany. Four others included the participation of scientists from Tel-Aviv, Israel; Zurich and Bern, Switzerland; and Saclay, France.

Although LAMPF is not scheduled to be operational until July of 1972, most experiments will take months of preparation. The first call for proposals was made several months ago to assure that experiments are ready when the Meson Facility becomes operational.

Proposals are submitted to the director of LAMPF. Preliminary processing is carried out by the direc-

continued on next page

Members of LAMPF's Program Advisory Committee eye the first group of proposals received for experiments at the Meson Facility. Louis Rosen, MP-division leader, right, noted: "None of us expected more than 15 to 20 proposals, but there were 69 and 13 letters of intent."

Addressing members of the LAMPF Users Group's Executive Committee and Technical Advisory Committee is Raemer Schreiber, technical associate director at LASL. The two committees held their meetings prior to that of the Program Advisory Committee.

tor and other members of his organization to judge their overall practicality. The organization may suggest revisions which will help experimenters to better utilize LAMPF resources or they may be forwarded to the Program Advisory Committee.

The Program Advisory Committee examines proposals and evaluates them in light of their scientific merit and feasibility. It recommends to the director either acceptance or rejection. It may also recommend priorities for those found acceptable and modifications which would require the submission of a revised proposal.

The committee is made up of 11 scientists not including Rosen, who, as the facility's director, is chairman, and Darragh Nagle, deputy director, who is alternate chairman. The other members were appointed by Rosen—50 per cent from candidates nominated by the Users Group's Executive Committee. They are appointed so that one-third of the members will be succeeded each year and to represent a suitable balance of the various scientific disciplines to be pursued at LAMPF and a reasonable balance in geographical and institutional representation. The members are Dr. M. L. M. Boone of the University of Wisconsin Medical Center; Kenneth Crowe of the University of California at Berkeley; N. M. Hintz of the University of Minnesota; V. W. Hughes of Yale University; Arthur Kerman of the Massachusetts Institute of Technology; D. A. Lind of the University of Colorado; A. M. Poskanzer of the Lawrence Radiation Laboratory at Berkeley; R. R. Rau of Brookhaven National Laboratory; Joseph Rothberg of the University of Washington; Richard Taschek of the Los Alamos Scientific Laboratory; and T. A. Tombrello of the California Institute of Technology.

After proposals have been examined by the committee, the director of LAMPF reviews them, judges them on the basis of scientific merit and notifies the experimenters as to whether their proposals have been accepted or rejected.

"The committee's first meeting went extremely well," Rosen said. "Its members got through all of the proposals set before them. Most of them were very good. The next thing we did was to write the spokesmen for each of the submissions and ask them to appear at the committee's next meeting July 5-11 to defend their proposals. The committee will also examine other proposals submitted by June 1, the deadline for those to receive consideration at the next meeting. After that, priorities for beam time will be recommended by the committee."

Science Youth Days

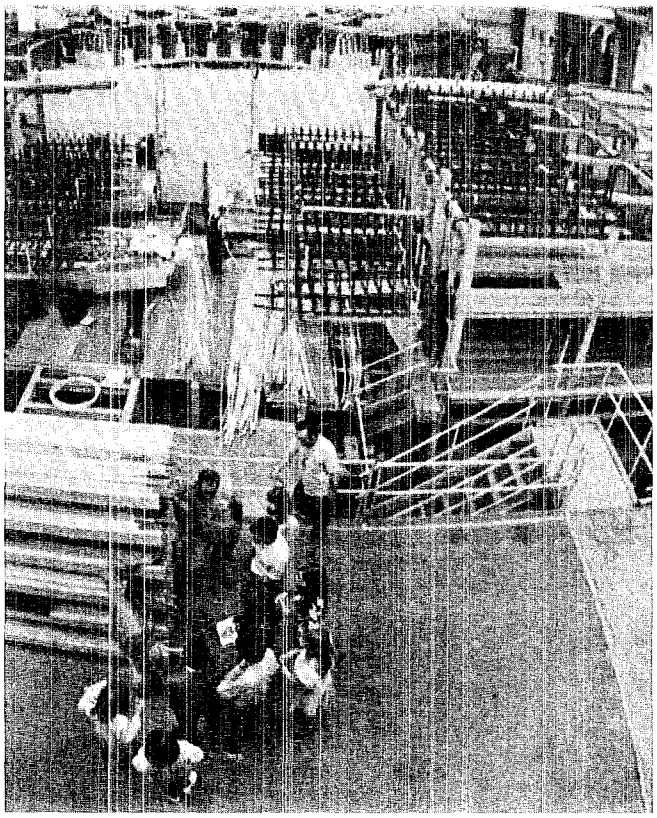
Photos by
Bill Jack Rodgers
Bill Regan
Ivan Worthington
Henry Ortega

Approximately 750 students from a five-state area converged on Los Alamos April 14-16 for Science Youth Days. They came from New Mexico, Texas, Colorado, Arizona and California to tour the Los Alamos Scientific Laboratory's facilities and to hear lectures by some of LASL's leading scientists.

Los Alamos High School seniors participated in the event during the first day only and then a selected number of them served as honorary guides for out-of-town students the following two days.

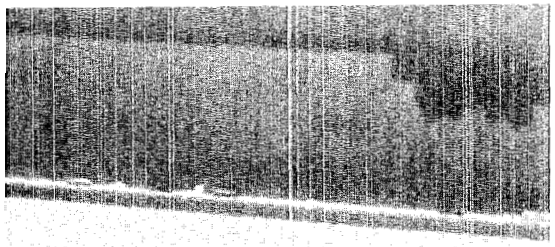
During the three-day event the students toured the Health Research Laboratory, Occupational Health Laboratory and Liquid Waste Disposal Area; Omega Site; Sherwood; the Tandem Van de Graaff; and the Los Alamos Meson Physics Facility.

The event marked the 14th time in 15 years that Science Youth Days have been held at LASL.

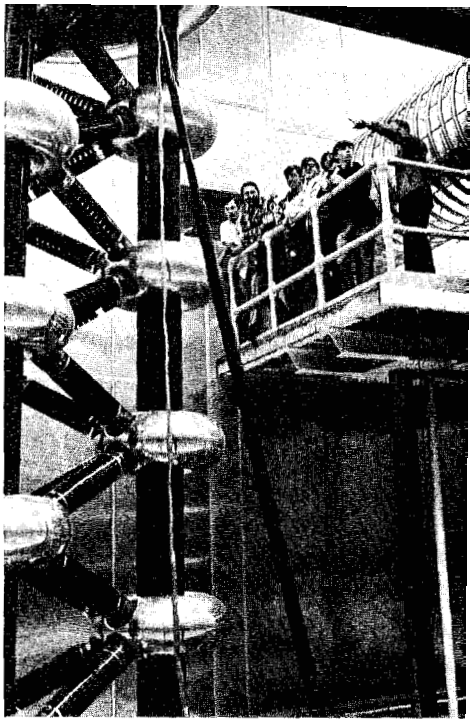


Above, Kent Wood of Los Alamos High School asks a question of Norris Nereson, P-2, at Omega Site.

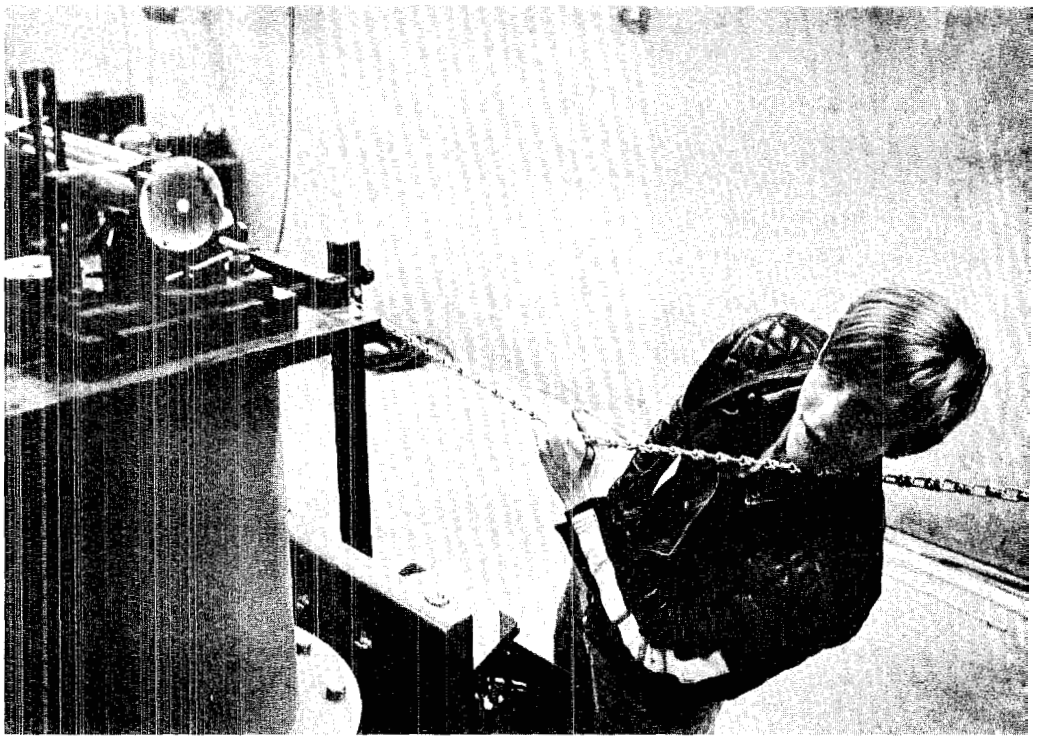
A group of Los Alamos students tour the Sherwood Program's Scyllac facility.



Left, Laboratory Director Harold Agnew talks with students in LASL's main auditorium.



Bob Hill, MP-1, points out the Cockcroft Walton high-voltage generator for one of the injector systems at LAMPF to students from La Jara, Colo.



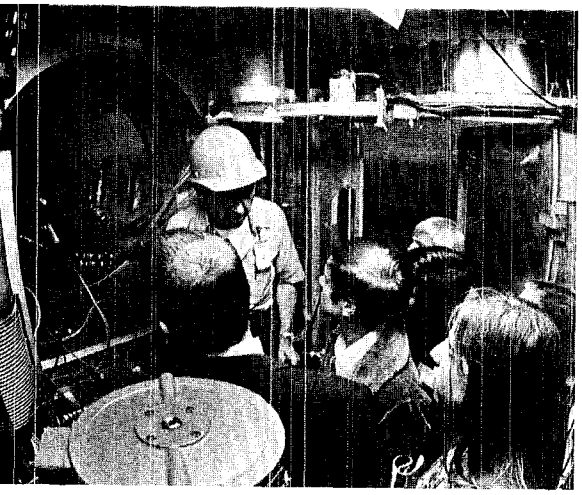
"Hey, it's a laser," said John Boone of St. Michaels High School in Santa Fe during a tour of the Los Alamos Meson Physics Facility.

Above left, Candi Bell of Monte Vista, Colo., pets one of the dogs at the Health Research Laboratory.

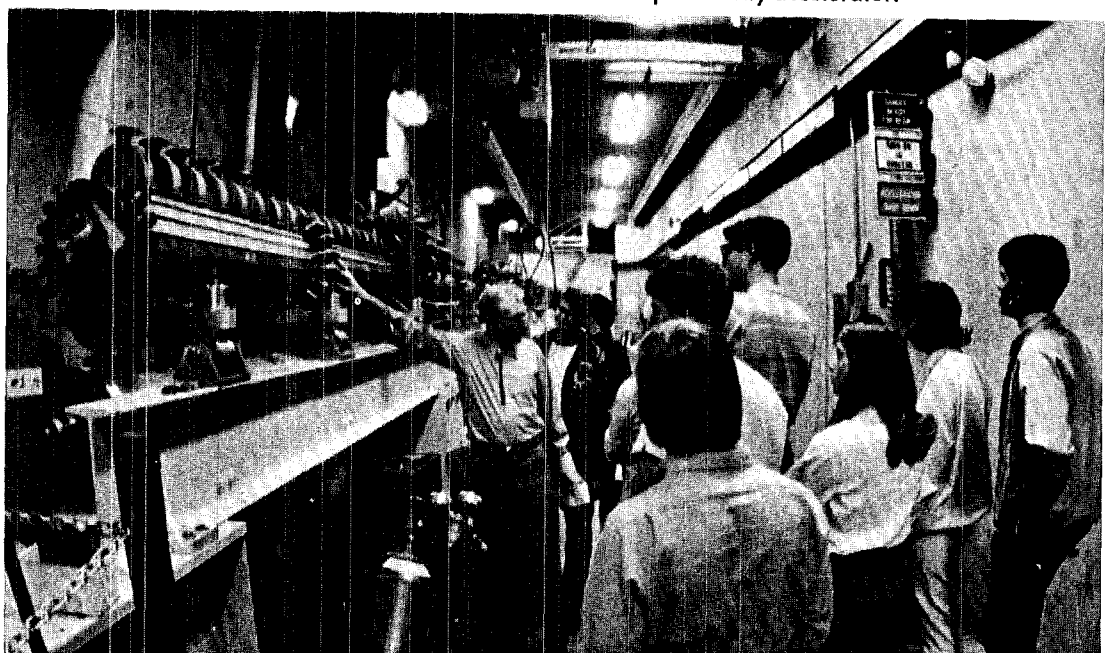
Raphael LaBauve (inside the exposure hood) and Bill Stocum, both of H-5, demonstrate a method for testing face masks under known work loads. LaBauve is wearing the mask in an environment of sodium chloride and is walking on a treadmill.

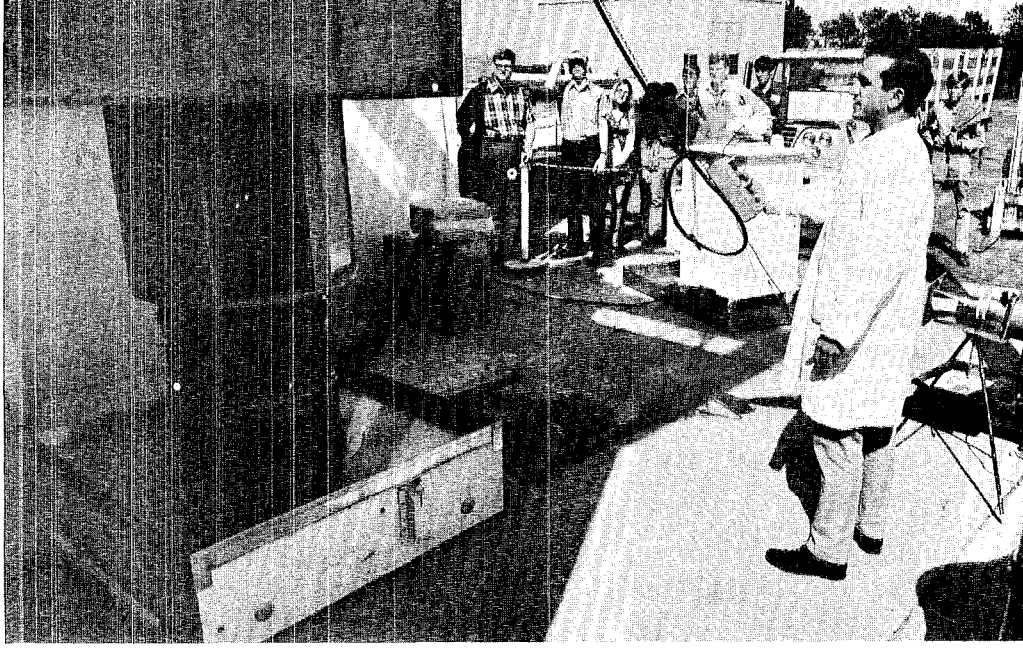
Below, Merle Bunker, P-2, explains a neutron radiography experiment at the Water Boiler reactor to students from Los Alamos.

Joe Bergstein, MP-1, explains instrumentation inside the ion-source equipment dome at LAMPF to students from Santa Fe.

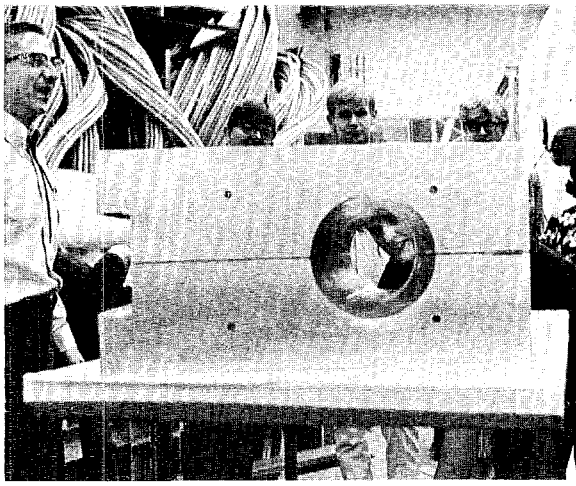


Above, Ginny Marcon and Edna Martinez, both of Walsenburg, Colo., look at a mouse held by John Spalding, of H-4. Below, Don Mueller, MP-4, shows Los Alamos students a portion of LAMPF's side-coupled cavity accelerator.





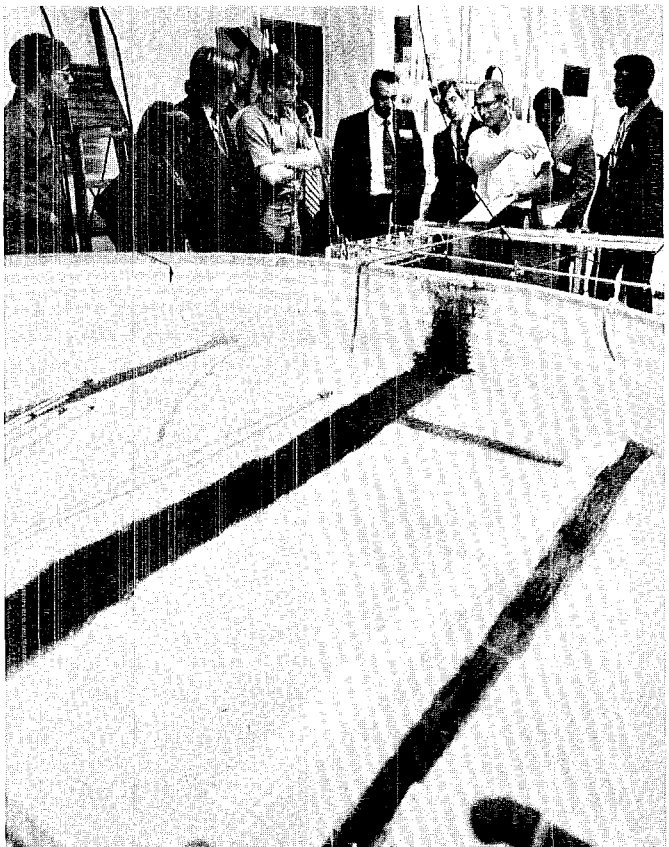
Ray Garde, H-7, demonstrated for students from Artesia, and El Paso, Texas, how contaminated wastes are compacted in barrels before being taken to burial sites.

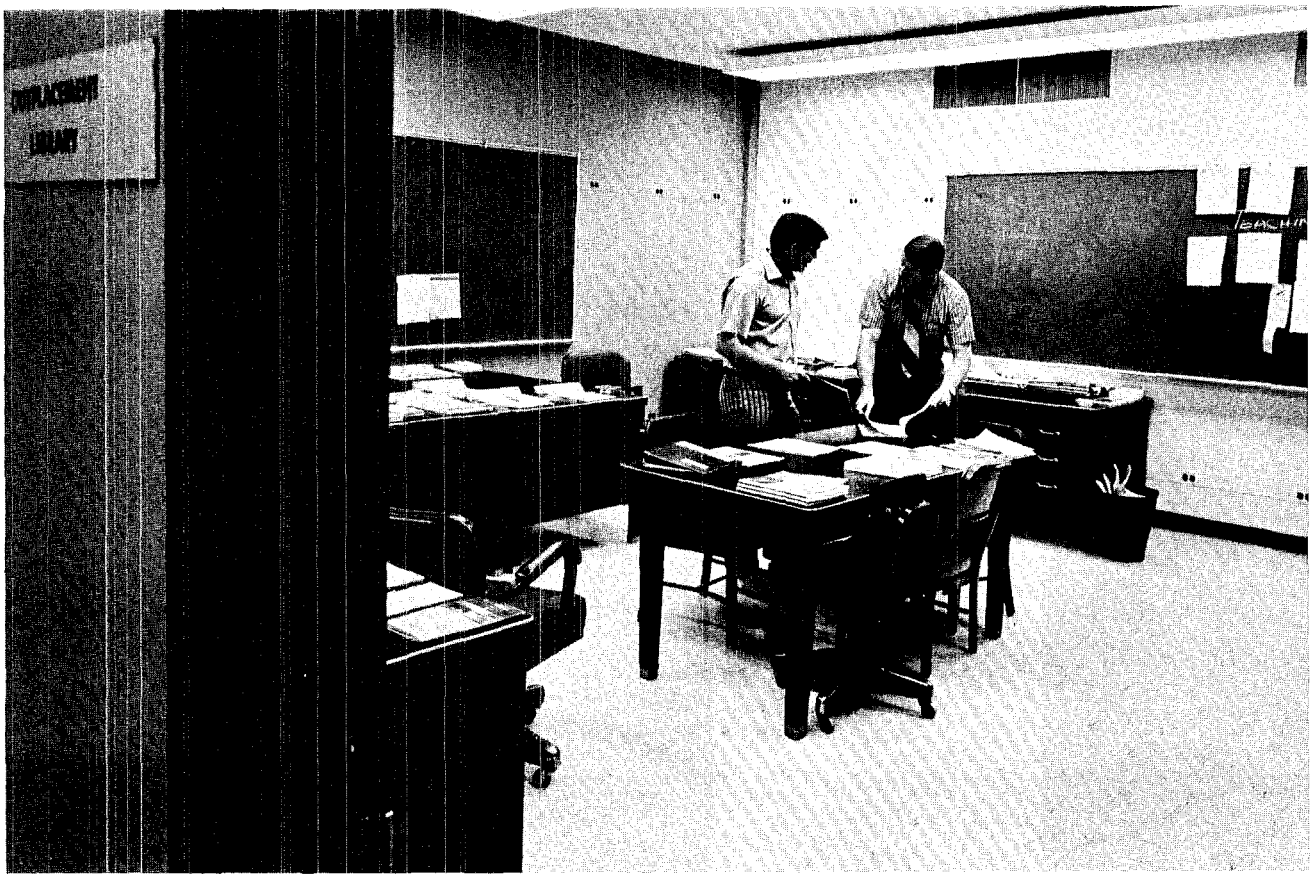


Right, Julie McGurn looks through the hole in an aluminum header like those that are used to clamp around Scyllac's quartz plasma tube. At left is Warren Quinn of P-15.

Jerry Buchholz, H-7, explains a pilot plant for converting contaminated water to potable water. Students are from Los Angeles, Calif., and Dalhart, Texas.

David Emigh, an honor guide from Los Alamos High School, shows Maureen Kelly of Jemez Springs and Kathy Fernandez of Taos that the grapic display link between the Tandem Van de Graaff accelerator and its computer system is a valuable interface between man and machine.





Lynn Wilson, PER-1 associate group leader, and Charles Mikkelson, also of PER-1, discuss material to be put in the Laboratory's Outplacement Library.

LASL's Reduction in Force

Approximately 250 persons—including about 100 volunteers—will be affected by a reduction in force at the Los Alamos Scientific Laboratory effective June 30. The Laboratory's Personnel department is currently extending its help to these persons to find new employment and the Office of Special Projects is continuing to bring new projects to the Laboratory.

Persons affected by the reduction in force represent a wide range of scientific, administrative and technician skills. "The Laboratory spent a lot of time, effort and money hiring them, and they were hired because they were considered to be outstanding," said Lynn Wilson, PER-1 associate group leader, who is responsible for Personnel's efforts in helping those on the RIF list to find other jobs.

The Personnel department staff is available to aid employees who will be affected by the reduction in force. These services include discussing openings within the Laboratory, assistance in locating potential employers outside the Laboratory, providing assistance in the preparation and typing of resumes, and maintaining an Employment Search Library which is open each workday.

The library includes classified sections of newspapers from all regions of the country, listings of employers by geographical locations and personnel requirements, information on employment search services, and job descriptions of specific positions available within the Laboratory and with outside employers.

Wilson noted that in talking with persons seeking new employment, they are reminded of placement services which are operated by the colleges and universities they attended and professional societies of which they are members. They are also advised regarding acceptable formats for preparing resumes.

"It's still up to the individual to find a job," Wilson said, "but we assist in every way we can. We have called, and are continuing to call other agencies throughout the country to learn of their personnel requirements. We follow up all leads that we hear of and we invite potential employers here to conduct interviews using our facilities. We are also advertising in eight professionally oriented journals that we have skilled people available for employment elsewhere."

The RIF list was minimized through the efforts of LASL's Special Projects Office which was established in October of 1970. The office was created with the approval of the Atomic Energy Commission to seek technical problems of national interest in which existing capabilities and facilities of the Laboratory could be used.

According to Austin McGuire of the Special Projects Office, new programs totaling about $2 million and which will employ about 80 persons were attained through the SPO. "The total amount devoted to this kind of work during the next fiscal year is still uncertain, but we expect it to be about $5.5 million," McGuire said. "A conservative estimate of the number of people that will be employed by these projects during the next fiscal year would be about 160."

Projects brought into the Laboratory through the SPO are approved by the Atomic Energy Commission and must be geared to the existing capabilities and facilities of the Laboratory.

"By the end of the current fiscal year we will either have started or will start on several projects for agencies other than the Atomic Energy Commission," McGuire said.

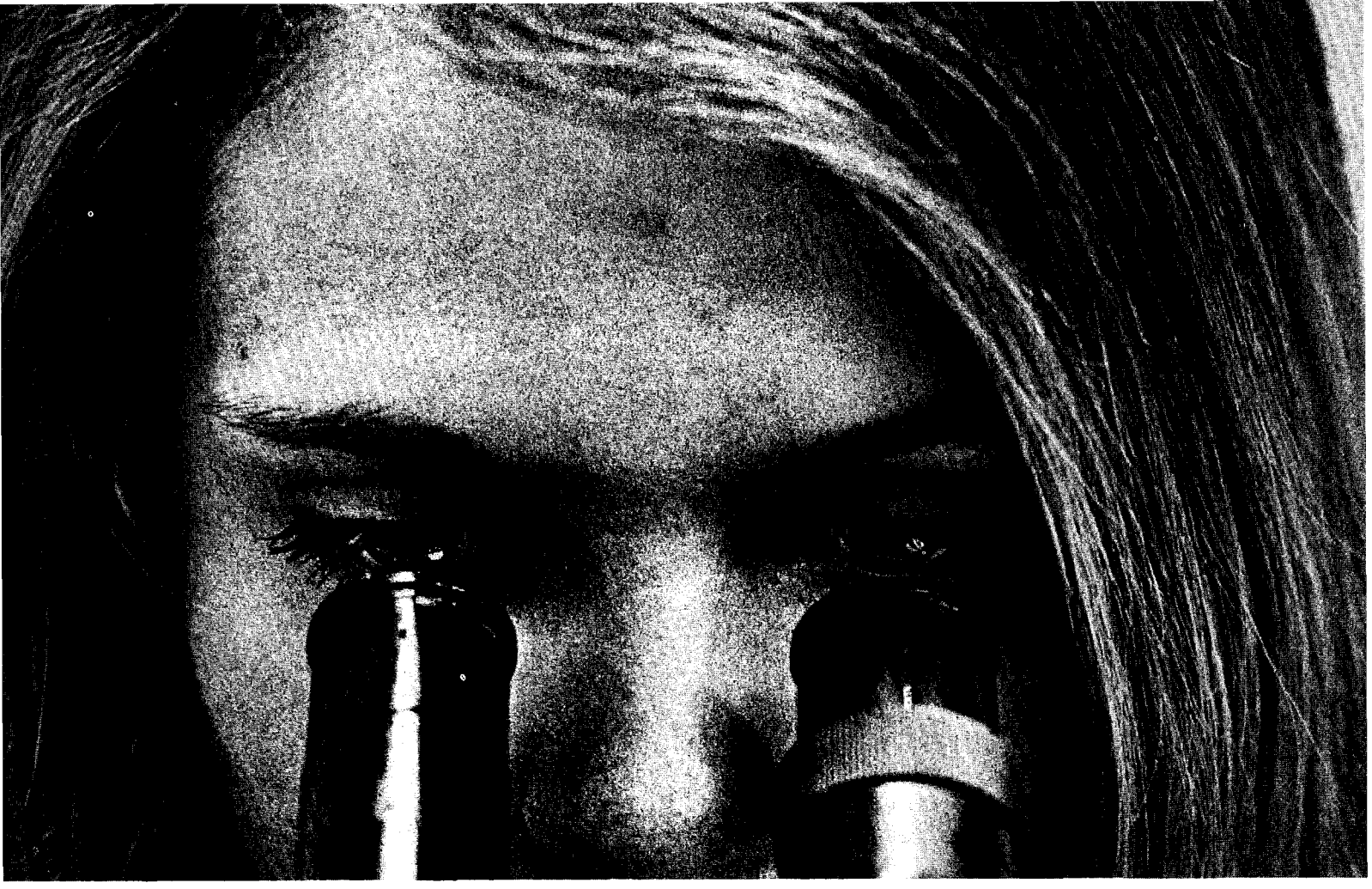
One of these projects is a joint LASL-NASA (National Aeronautics and Space Administration) physics experiment in which Group P-4 will build an instrument for the future Venus-Mercury mission spacecraft to measure electron density and flux in outer space.

Austin McGuire of LASL's Special Projects Office works to bring new projects to the Laboratory.

Several biological experiments supported by the National Institute of Health have been started in Group H-4.

Other programs arranged through the Office of Special Projects include some laser research for the Defense Atomic Support Agency (DASA) which will be conducted under LASL's director of laser projects, Keith Boyer; another DASA project will be conducted by J-10; a project for NASA will be done by N-DOT; and another for the Space and Missile Systems Organization (SAMSO) will be conducted by Group A-2 with the help of MP- and GMX-divisions.

Negotiations with other agencies are continuing and are expected to result in many more new projects for the Laboratory.



Peggy Hoffer peers through a microscope at New Mexico State University's Physical Science Laboratory where she works part-time.

LASL's Student Contingent at NMSU

What could three technical groups at the Los Alamos Scientific Laboratory possibly have in common with a group of students and students' wives at New Mexico State University? The answer to that question is data reduction—the technical groups need it to further their work and the students need it to supplement their incomes.

For several years, Groups W-8, P-3 and P-10 have been contracting some data-reduction work to NMSU's Physical Science Laboratory. The students who do this work, in essence, interpret photographic records of nuclear reaction rates.

Nuclear reactions are a necessary part of making nuclear cross-section measurements. A cross section is the probability of an interaction between a particle and a target nucleus. Nuclear cross-section values for a given nuclide vary with the particular reaction and are a function of the energy of the bombarding particles. Knowledge of these values has important bearing on the selection of materials in nuclear reactor and weapons design and also plays an important role in programming nuclear reactors for the production of rare isotopes.

Groups W-8 and P-3 have traditionally worked together in gathering cross-section information. Of primary interest to these groups are cross sections to be measured from the interaction of target nuclei with the highly intense neutron beams that can be produced from underground nuclear tests. Tremendous amounts of film records have resulted from these ex-

periments. In 1969, for example, film records from one experiment corresponded to about a mile and a quarter of oscilloscope trace.

Once the film is available, the work has only begun for it must still be reduced to obtain meaningful data. Cross-section experiments in conjunction with underground tests were begun by W-8 and P-3 in 1964. Reading the film manually was out of the question because tests were conducted too infrequently to provide qualified personnel with year-around employment. Various schemes for automatic reading of the film were attempted, but so far none of these have produced sufficiently accurate readings.

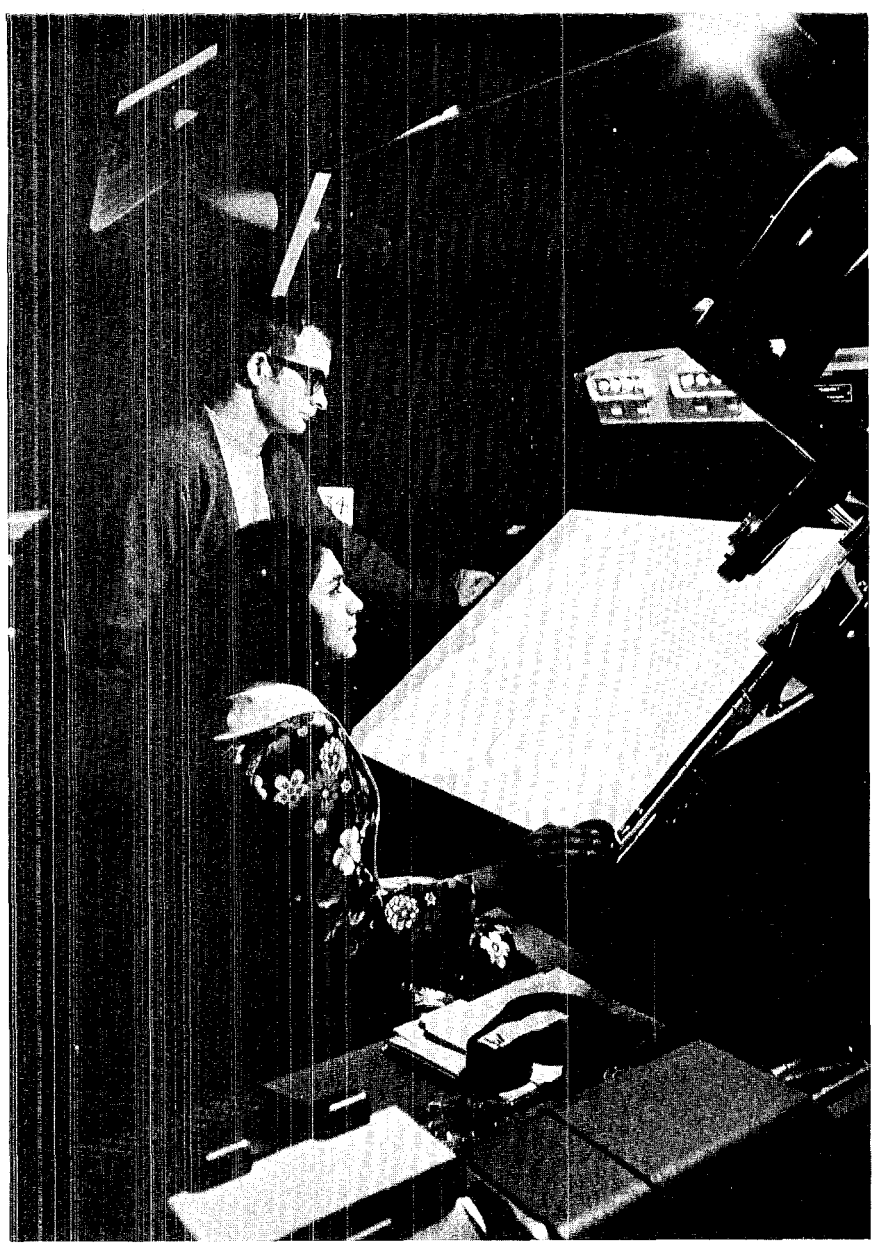
For these reasons Arthur Hemmendinger, W-8 group leader, in 1967 began contracting this work to NMSU's Physical Science Laboratory where suitable equipment is available, and, of all things, is operated by students and students' wives. This equipment is provided by the U.S. Army and is used in the reduction of its data from the White Sands Missile Range. When time permits, the equipment can be used to do work for other agencies.

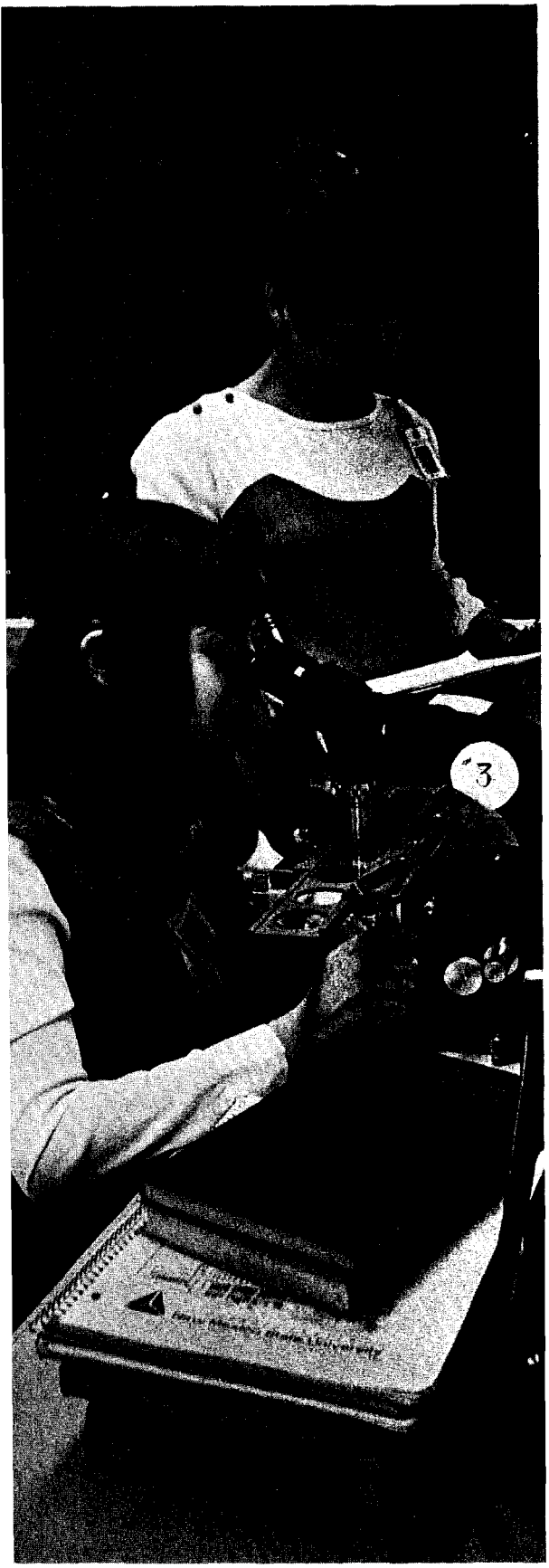
On each occasion when W-8 and P-3 have had film for the students to read, Phil Seeger of W-8 has delivered it to the Physical Science Laboratory and instructed supervisory personnel and students on the information to be extracted from it. The students then convert the film data to the digital language of LASL's complex computers.

Unlike Groups W-8 and P-3 which provide only occasional work for the students, data reduction for Group P-10 continues uninterrupted. For P-10 the students read nuclear track plates—photographically sensitized emulsion on glass plates. These track plates are exposed at accelerator facilities at LASL and elsewhere on occasion to investigate particle interactions

continued on next page

Stan Good and Nina Salazar operate one of the comparators used by members of the Tracking Camera Unit to do work for LASL Groups W-8 and P-3.





Mary Gaffney reads track plates during free time between classes under the supervision of Betty Doil, head of the Tracking Camera Unit.

in the low and intermediate energy regions.

Plates read by the students are the more routine ones—those which require no collaboration between reader and researcher—and make up only a small part of the total volume read by P-10 personnel.

It's more understandable to say the students read about 40 bands (exposures) per year than to state a number of track plates. Track plates can have from one to three bands on them and each one takes from 40 to 50 hours to read.

According to Wallace Leland, P-10 group leader, the installation of a spectrograph at LASL's Tandem Van de Graaff accelerator several years ago meant scientists would be conducting more and more experiments. "We could see that our plate-reading capabilities would be taxed, and it was apparent we were going to need outside help. They had never done any plate reading at NMSU, but they were reading film from White Sands and other places, and reading track plates isn't all that different. We loaned them three of our microscopes and one of their people spent a week with us in an intensive training program to learn how to read plates. She, in turn, teaches the students who do our work."

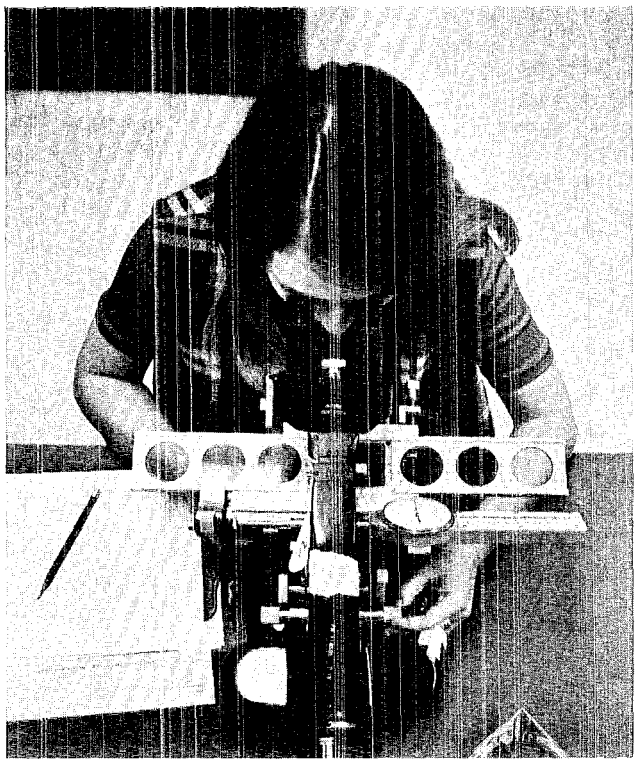
This was Betty Doil who now heads the Physical Science Laboratory's Tracking Camera Unit. The unit is a part of the Data Reduction Section at the Laboratory.

The Laboratory is a nonprofit research and development arm of New Mexico State University and occupies a unique position relative to a number of government and private agencies. This position evolved in the beginning by virtue of its location adjacent to the White Sands Missile Range. It soon became involved in instrumentation and data processing functions for several government and private groups. Over the years this activity expanded and became more diverse until today it provides a wide variety of research and developmental services to support defense, space and other scientific activities around the world.

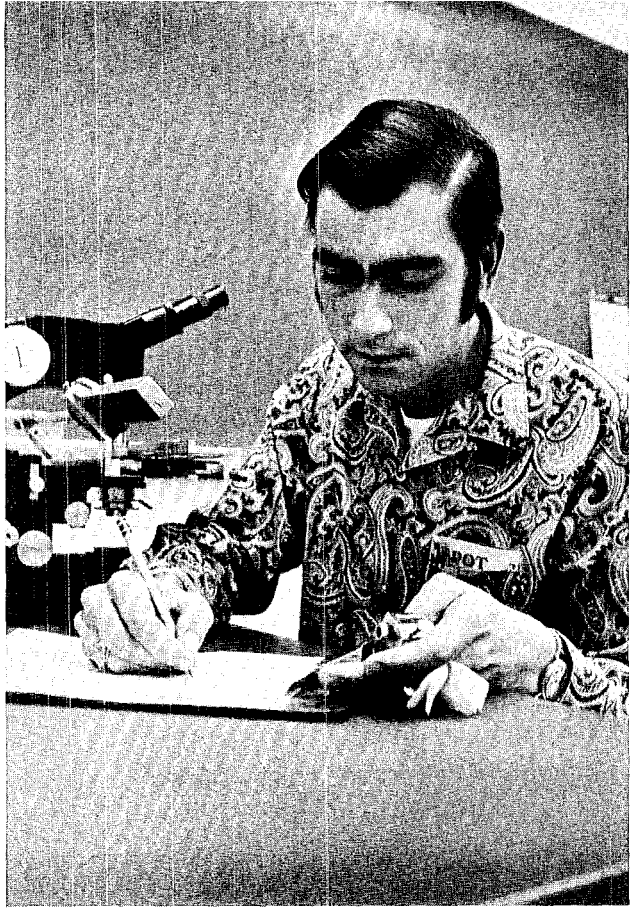
The Physical Science Laboratory employs about 700 persons, including approximately 300 students or students' wives who work part-time. Among students, the Laboratory, which is housed in Clinton P. Anderson Hall, is one of the most popular places on campus to hold a part-time job. There are nearly as many student applications on the waiting list as there are students employed at the Laboratory.

It doesn't make any difference what a student's major is if he can meet other standards for employment which have been established by the University. For example, the six students employed in the Data Reduction Section's Tracking Camera Unit represent several different fields of interest. Richard Roach, from Alamogordo is majoring in journalism; Stan Good, Las Cruces, is majoring in micro-biology; Nina Salazar, Las Cruces, business education; Cortis Cooper, Florence, Ariz., engineering; Peggy Hoffer, Las Cruces, sociology; and Mary Gaffney, Las Cruces, elementary education.

"The students work from 12 to 24 hours each week," according to Ray Chavez, chief of the Data Reduction Section. "They must have a 2.4 grade point average to start and must maintain a 2.0 grade point average thereafter. A freshman must have been in the upper 10 per cent of his graduating class to start. We have no problems with regard to grades among the students in the Tracking Camera Unit. All of them have better than a 3.0 grade point average."



One of three microscopes loaned to NMSU to do work for Group P-10 is operated by Peggy Hoffer.



Richard Roach uses a small mechanical counter to keep track of particles he has counted on one of P-10's nuclear track plates.

Ray Chavez, chief of the Data Reduction Center at the Physical Science Laboratory, and Betty Doil study a three-band nuclear track plate which will be read by students at the Laboratory. Each band takes 40 to 50 hours to read.

short subjects

Effective June 1, the Norris E. Bradbury Science Hall will be closed to the public during the noon hours Monday through Friday and on weekends.

The new operating hours are being imposed because of budget reductions. "Memorial Day weekend will be the last weekend the Hall will be open to the public under this policy," said **Bob Brashear,** ISD-2 Science Hall manager.

Through March of this year, 363,455 persons toured the facility since its establishment in 1964. This includes about 5,000 visitors from 119 countries.

Laboratory Director **Harold Agnew** was presented the National Aeronautics and Space Administration Public Service Award last month by George Low, acting NASA administrator.

The award reads in part ". . . for his dedicated service as a member of the Aerospace Safety Advisory Panel which contributed significantly to the safety and success of the Apollo Program."

Alfred Wolf, a former LASL employee, received the $2,000 American Chemical Society Award for Nuclear Applications in Chemistry at the Society's 161st national meeting. The award, presented to Wolf for his work in "hot-atom" chemistry, is sponsored by G. D. Searle & Co. of Chicago.

During World War II, Wolf worked for two years at Los Alamos. He is now senior chemist at the Atomic Energy Commission's Brookhaven National Laboratory and adjunct professor of chemistry at Columbia University.

Zia Company celebrated its 25th anniversary at Los Alamos in April with a luncheon and presentation of 25-year service award pins.

Among the 86 employees receiving the 25-year service award pins were Zia Company President **C. David McKee** and **Wendell Miller,** manager.

The company is the Atomic Energy Commission's maintenance and operations contractor at the Los Alamos Scientific Laboratory.

Donald Mark, GMX-6 photographer, died of injuries received when the motorcycle he was riding collided with an automobile on Pajarito Road. A retired U. S. Navy veteran, Mark had been employed by the Laboratory since 1965. He is survived by his wife, Victoria, and six children: Michael, Philip, Stephen, Alexander, Matthew and Margaret.

Herbert Wheitsel, a LASL machinist from 1951 to 1967, died in Palm Harbor, Fla. He is survived by his wife, Dorothy, formerly with H-division, and two children: Herbert, Jr., and Lydia.

Cliff Weaver, an employee of N-5 since 1959, died April 14. He is survived by his wife, Carolyn, and three daughters: Christine, Cathleen, and Kelley.

Three employees of the Los Alamos Scientific Laboratory will help select the Atomic Energy Commission Special Awards winners and their alternates at the 22nd International Science and Engineering Fair. The fair, which will be held in Kansas City, Mo., May 12, is the "Olympic Games" for high school science exhibitors.

Named to the 14-member AEC Special Awards Judging Panel from Los Alamos are **Delbert Sundberg,** head of the Information Services Department; **Dr. George Voelz,** H-division leader; and **James Tuck,** associate P-division leader.

Laboratory Director Harold Agnew talks with visiting Edward Condon of the Joint Institute for Laboratory Astrophysics. Condon's primary interest at LASL was in progress made on rock-melting bits at CNC-4. He is professor emeritus at the University of Colorado, Boulder, and former director of the National Bureau of Standards.

the technical side

Taken from LASL Technical Information Reports submitted through ISD-6

Meeting of the International Atomic Energy Agency, Panel on Underground Applications of Nuclear Explosives, Vienna, Austria, Jan. 18-22:

"A Method for Estimating the Risk from a Plowshare Detonation" by H. J. Otway, J-DOT

Materials Science and Engineering Seminar, University of Utah, Salt Lake City, Feb. 16:

"What Do We Do If the Theory Doesn't Match the Experiments? Quasi Thermodynamic Theory and Liquid Alloy Behavior" by G. R. B. Elliott, CNC-2

Seminar, Iowa State University, Ames, Feb. 17:

"Ultralow Temperature Nuclear Physics" by J. R. Sites, P-8

Seminar, Cincinnati University, Ohio, Feb. 19:

"Quantum Solids and Thermometry" by J. R. Sites, P-8

General Advisory Committee, Los Alamos, Feb. 26:

"Toroidal Z-Pinch Program" by J. A. Phillips, P-14

Presentation to the General Advisory Committee, Los Alamos, Feb. 26:

"Applications of Superconductivity in Controlled Thermonuclear Research and Similar Problems" by F. L. Ribe, P-15

Presentation at the 22nd Pittsburgh Conference on Analytical Chemistry and Applied Spectroscopy, Cleveland, Ohio, Feb. 28-March 5:

"The Rapid Separation and Determination of Microgram Amounts of Mercury" by I. K. Kressin, CNC-4

Presentation at the American Institute of Mining and Metallurgical Engineers Centennial Meeting, New York City, March 1:

"The Stability of Sodium-Bonded Actinide Carbides in Type 316 Stainless Steel Containers" by F. B. Litton, N-1, and T. C. Wallace, CMB-2

Task Force on Research and Development Goals, Energy Research Council, San Diego, Calif., March 1:

"Status and Prospects of Pulsed, High-Beta Theta-Pinch Systems" by F. L. Ribe, P-15

Lovington High School, N.M., March 1, and Goddard High School, Roswell, March 2:

"Cryogenics and Cryogenic Engineering" by F. J. Edeskuty, P-8

Seminar, New York University, New York City, March 1, and Ford Motor Company Scientific Laboratory, Dearborn, Mich., March 2:

"Molecular Vibrations and Bonding in the Cobalticyanide Ion, $[co(cn)_6]^{-3}$, and Dicesium Lithium Cobalticyanide, $Cs_2LiCo(CN)_6$" by B. I. Swanson, CNC-4 (invited)

1971 Particle Accelerator Conference, Chicago, Ill., March 1-3:

"The LAMPF Switchyard Magnets" by A. Harvey and R. D. Turner, both MP-6

"Operation of the LAMPF 750-keV Injector" by P. W. Allison, C. R. Emigh, E. A. Meyer, D. W. Mueller and R. R. Stevens, Jr., all MP-4

"A Beam-Spill Monitor for LAMPF" by J. R. Parker, J. D. Oetting and J. D. Easley, all MP-1, and J. H. Richardson, T-DOT

"Beam-Profile Monitoring and Analysis by Television" by J. R. Parker, MP-1, P. W. Allison, D. W. Mueller and R. R. Stevens, Jr., all MP-4

"Wirerun—A Computer Program for Wiring Large Projects" by J. R. Case, ENG-4

"A Beam Inhibit System for LAMPF" by A. L. Criscuolo, MP-1

"High Performance Klystrons for Accelerator Applications" by P. J. Tallerico, MP-2

"Accelerator Field Measurements at High Power" by D. J. Liska, R. A. Jameson, J. D. Wallace, all MP-2, and J. B. Sharp, MP-1

"Feedforward Control of Accelerator RF Fields" by R. A. Jameson and J. D. Wallace, both MP-2

"The Effects of Radiation on Superconducting Nb-Ti-Wire" by W. L. Hassenzahl, MP-6, J. D. Rogers, P-8, and W. C. Armstrong, Cornell University, Ithica, N.Y.

"Beam Measurements on the First Tank of LAMPF" by D. A. Swenson, B. C. Goplen, M. A. Paciotti and J. E. Stovall, all MP-3

"The LASL Multi-Computer Van de Graaff Control and Graphic Display System and Experiments with Automatic Beam Optimization" by D. E. McMillan and R. Woods, both P-9, and M. W. Collins, C-2

"Tuning and Pre-Beam Checkout of 805 MHz Side-Coupled Proton Linac Structures" by G. R. Swain, E. A. Knapp, both MP-3, R. A. Jameson, D. J. Liska and J. D. Wallace, all MP-2, and J. M. Potter, MP-4

"Status Report on LAMPF" by E. A. Knapp, MP-3 (invited)

"Relevance of Particle Accelerators to National Goals" by L. Rosen, MP-DO (invited)

"A Standard Interface Concept for Computer-Controlled Particle Accelerators" by D. R. Machen and L. R. Biswell, both MP-1

"An Operator's Console for the LAMPF Accelerator" by H. S. Butler, B. L. Hartway, D. R. Machen and T. M. Putnam, all MP-1

National Symposium on Natural and Manmade Radiation in Space, Las Vegas, Nev., March 1-5:

"Venting of Fission Products and Shielding in Thermionic Nuclear Reactor Systems" by E. W. Salmi, N-5

"The External Gamma Radiation Environment from the Kiwi, Phoebus, and Pewee Reactors" by R. E. Malenfant, N-2 (invited)

"Effect of Continuous Gamma-Ray Exposure on Performance of Learned Tasks and Effect of Subsequent Fractionated Exposures on Blood-Forming Tissue" by J. F.

continued on next page

Spalding, L. M. Holland and J. R. Prine, all H-4, and D. N. Farrer and R. G. Braun, 6571st Aeromedical Research Laboratory, Holloman Air Force Base, N.M.

Program Review Meeting, Atomic Energy Commission-Division of Reactor Development and Technology, Washington, D.C., March 2-4:

"Introduction-Analytical Standards for Fast Breeder Reactor Oxide Fuels" by C. F. Metz, CMB-1

"Statistically Designed Program for Sampling and Analysis of LMFBR Fuels" by R. K. Zeigler, C-5

"Development of Methods for Fuels and Source Materials" by G. R. Waterbury, CMB-1

"Analytical Standards for Fast Breeder Reactor Oxide Fuel" by J. E. Rein, CMB-1

"Burnup Studies for LMFBR/FFTF Fuel" by J. E. Rein, CMB-1

"Analytical Chemistry and Electron Microprobe Capabilities for Irradiated Materials and Gamma Scanning" by G. R. Waterbury, CMB-1

"Examination of Fast Breeder Reactor Fuels" by J. W. Schulte, CMB-14, K. A. Johnson, CMB-11, and G. R. Waterbury, CMB-1

"Examinations of Unirradiated Reactor Fuel Materials" by G. R. Waterbury, CMB-1

"Analytical Chemistry and Electron Microprobe" by G. R. Waterbury, CMB-1

"Program Review—Los Alamos Advanced Plutonium Fuels Program" by J. L. Green, J. O. Barner and J. F. Kerrisk, all CMB-11

"Microstructural Analysis of Irradiated Fuel Sections and Cladding" by K. A. Johnson, CMB-11

"Irradiating Testing of Potential LMFBR Fuel Element Systems by the Los Alamos Scientific Laboratory" by J. O. Barner, CMB-11

"Comprehensive Analytical Chemistry Program for LMFBR/FFTF Fuel and Source Materials" by J. E. Rein, CMB-1

Colloquium, Ohio State University, Columbus, March 3:

"Progress Report on the Los Alamos Meson Physics Facility" by L. Rosen, MP-DO

Department of Chemistry, University of New Mexico, Albuquerque, March 3:

"Nuclear Weapons and Societal Implications" by J. E. Sattizahn, Jr., CNC-11 (invited)

American Society for Nondestructive Testing 1971 Annual Spring Conference, Los Angeles, Calif., March 8-12:

"Flash X-Ray During Electron Beam Welding" by L. E. Bryant, GMX-1

Science class, Pueblo Junior High School, Los Alamos, March 11:

"Health Physics" by D. E. Hankins, H-1

Seminar on Proton Storage Ring for Preceton, Rutgers University, New Brunswick, N.J., March 11-12:

"Negative Ion Injection into an 800-MeV Proton Storage Ring" by D. E. Nagle, MP-DO

Third Conference on Neutron Cross Sections and Technology, Knoxville, Tenn., March 15-17:

"Neutron Induced Fission Cross Sections of ^{230}Th and ^{231}Pa" by D. W. Muir and L. R. Veeser, both W-8

"Radiative Capture of Neutrons in the Million-Electron-Volts Region" by I. L. Bergqvist, D. M. Drake and D. K. McDaniels, all P-DOR

"Photon Production Data Review and Retrieval in the ENDF" by D. J. Dudziak, T-1

"Fission Cross Section of Californium-249" by M. G. Silbert, P-DOR, R. W. Lougheed, J. E. Evans and R. W. Hoff, all Lawrence Radiation Laboratory, Livermore, Calif.

"Cross Section Processing in a Modular Environment" by A. F. McGirt, M. W. Asprey and M. S. Hoyt, all C-4

"Thorium-232 Neutron Capture in the Region 20 eV-30 keV" by L. Forman, A. D. Schelberg, J. H. Warren, M. V. Harlow and N. W. Glass, all J-16, and H. A. Grench, Palo Alto Research Laboratory, Palo Alto, Calif.

"Raymath, A Problem-Oriented Computer Language Designed for Processing Neutron Cross-Section Data" by M. V. Harlow, J-16, K. D. Ferrell, EG&G, Albuquerque, R. Plaisted, University of Wisconsin, Madison, and A. Phillips, EG&G, Los Alamos.

"Neutron Scattering Cross Section of ^{197}Au" by M. M. Hoffman, G. J. Berzins, W. M. Sanders, L. J. Brown and D. D. Phillips, all J-12

"Status and Comparison of Techniques for Resonance Measurements" by M. S. Moore, P-3 (invited)

"Subthreshold Fission in Plutonium-242 and Plutonium-244" by G. F. Auchampaugh, P-3, J. A. Farrell, W-8, and D. W. Bergen, W-9

"A Study of the Uniqueness of the R-Matrix Parameters Using the Fortran Code, MULTI" by G. F. Auchampaugh, P-3

"Integral Comparisons for Fast Critical Assemblies" by R. E. Hunter, Valdosta State College, Georgia, C. C. Cremer and D. R. Worlton, both TD-4

Seminar, Ames Laboratory, Iowa State University, Ames, Iowa, March 16:

"Recent Progress in Controlled Thermonuclear Fusion Research" by J. L. Tuck, P-DO

Eighteenth Refractory Composites Working Group Meeting, Huntsville, Ala., March 16-18:

"Carbide-Graphites Composites" by R. E. Riley, CMB-6

"Research and Development on Graphite and Graphite-Matrix Composites at LASL" by M. C. Smith, CMB-13

Sandia Chapter, American Society for Metals, Albuquerque, March 18:

"The Effect of Morphology on the Characteristics of Particulate Materials" by R. E. Riley, CMB-6

Seminar, Utah State University, Logan, March 22:

"The ^{13}C Program at LASL" by N. A. Matwiyoff, CNC-4 (invited)

Annual Sherwood Theoretical Meeting, New York University, New York City, March 22-23:

"High Frequency A. C. Electrostatic Plasma Instabilities" by J. P. Freidberg and B. M. Marder, both P-18

"Stability of the Straight $l = 1$ Scyllac Configuration" by J. P. Freidberg, P-18

"Electron Cyclotron Drift Instability" by D. W. Forslund, R. L. Morse and C. W. Nielson, all P-18

Ninth Annual Symposium on Biomathematics and Computer Science in the Life Science, Houston, Texas, March 22-24:

"An Extension of Some Grubbs-Type Statistics for the Detection of Several Outliers" by G. L. Tietjen, C-5

Western Regional Institute of Mathematical Statistics Meeting, Las Vegas, Nev., March 22-24:

"Statistical Properties of Solutions to Convolution-Type Integral Equations" by B. R. Hunt, C-5

Asilomar Conference on the Solar Wind, Pacific Grove, Calif., March 22-26:

"A Heliographic Latitude Dependence in the Solar Wind Plasma Flow" by A. J. Hundhausen, T-12, S. J. Bame and M. D. Montgomery, both P-4

"Interplanetary Shock Waves and the Structure of Solar Wind Disturbances" by A. J. Hundhausen, T-12 (invited)

"Introductory Talk at Round Table Discussion on the Angular Momentum of the Solar Wind, the Sun, and the Stars" by A. J. Hundhausen, T-12

"Spacecraft Observations of the Solar Wind Composition" by S. J. Bame, P-4 (invited)

"Helium Enriched Interplanetary Medium and Solar Flares" by J. Hirshberg, Stanford University, Stanford, Calif., S. J. Bame, P-4, and D. E. Robbins, NASA Manned Spacecraft Center, Houston, Texas

"The Properties of Solar Wind Electron, May 1967–May 1968" by M. D. Montgomery, P-4

"Microscopic Instabilities in the Solar Wind" by D. W. Forslund, P-18

Pinon Elementary School, White Rock, N.M., March 23:

"Elementary Cryogenics" by J. R. Bartlit, P-8

Metallurgy Graduate Seminar, Department of Mineral Engineering, University of Utah, Salt Lake City, March 24:

"Combustion Calorimetry of Metals and Metallic Compounds" by C. E. Holley, Jr., CNC-2 (invited)

Seminar, Arizona State University, Tempe, Ariz., March 25-26:

"Molecular Vibrations and Bonding in the Cobalticyanide Ion, $[Co(CN)_6]^{-3}$, and Dicesium Lithium Cobalticyanide, $Cs_2LiCo(CN)_6$" by B. I. Swanson, CNC-4 (invited)

Seismological Society of America's 66th Annual Meeting, Riverside, Calif., March 25-27:

"Physical Considerations for Estimating Tsunami-Like Waves from an Underground Nuclear Explosion Near a Shoreline" by K. H. Olsen, J-9, Li-San Hwang and D. Divoky, Tetra Tech, Inc., Pasadena, Calif.

"One-Dimensional Underground Explosion Calculations" by A. H. Davis and J. N. Stewart, both J-9

Colorado Section, American Nuclear Society, Denver, March 26:

"Time-of-Flight Measurements with Nuclear Explosions" by M. S. Moore, P-3

Seminar, Moore School of Electrical Engineering, University of Pennsylvania, Philadelphia, March 26:

"Plasma Simulation'" by B. M. Marder, P-18

National American Chemical Society's 161st Meeting, Los Angeles, Calif., March 28-April 2:

"Nitrogen-15 Relaxation Times in the Methyl Amines, Ammonia, and $^{15}ND_3$" by W. M. Litchman, University of New Mexico, Albuquerque, and M. Alei, Jr., CNC-2

"A Study of ^{15}N NMR Shifts in Pure Methyl Amines and Pure $CH_3C^{15}N$" by M. Alei, Jr., and A. E. Florin, both CNC-2, W. M. Litchman, University of New Mexico, Albuquerque, and J. F. O'Brien, Southwest Missouri State College, Springfield, Mo.

"High Pressure Ternary Thorium Rare Earth Carbide Superconductors" by M. C. Krupka, A. L. Giorgi and E. G. Szklarz, all CMB-3

"A Versatile Chemical Laser System" by W. W. Rice and R. J. Jensen, both J-10

"Characterization and Tracking of Aerosol Sources with the Use of Aircraft Sampling" by G. A. Cowan, CNC-DO, T. G. Gregory, Jr., GMX-1, P. R. Guthals, W. A. Sedlacek and H. L. Smith, all CNC-11

Idaho Nuclear Corporation, Idaho Falls, March 29:

"Recent Results of Cross-Section Measurements with Nuclear Explosion Sources" by M. S. Moore, P-3

American Nuclear Society Meeting, Idaho Falls, Idaho, March 29-31:

"User Experience with Datatran at LASL" by F. McGirt, C-4, and R. E. Alcouffe, T-1

"Monte Carlo Sampling with Continuously Varying Cross Sections Along Flight Path" by L. L. Carter, E. D. Cashwell and W. M. Taylor, all TD-6

"A Non-Iterative Method for Time Dependent Transport" by W. H. Reed, T-1

"Generating Moments of the Photon Production Matrices and Sources from ENDF Data: The LAPHAN Code" by D. J. Dudziak and R. E. Seamon, both T-1

"Future Prospects in Computer Technology" by W. J. Worlton, CADP (invited)

"Elimination of Ray Effects by Converting Discrete Ordinates Equations to Spherical-Harmonic-Like Equations" by K. D. Lathrop, T-1

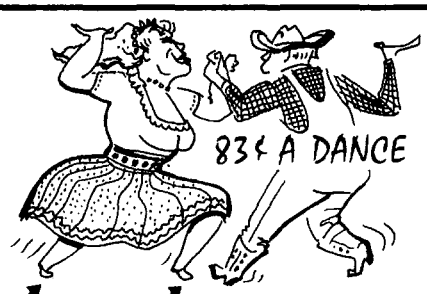
Seminar, University of Houston, Texas, March 30:

"LAMPF Facilities: HRS and EPICS and Their Use" by H. A. Thiessen, MP-7

SECEDE II Data Review Meeting, Stanford Research Institute, Menlo Park, Calif., March 30-31:

"Airborne Photography of the SECEDE II Barium Releases" by J. S. Beardall, R. A. Jeffries and D. M. Kerr, Jr., all J-10

20 years ago in los alamos



Culled from the May, 1951, files of the Los Alamos Herald by Bob Porton

Big Financial Deal

The new Community Council indulged in a burst of generosity Wednesday night. The net profit of the recent square dance festival was turned over to the Council, which in turn voted magnanimously to give the profit back to the festival sponsors. The profit was eighty-three cents!

Bradbury Elected to NAS

Norris Bradbury, director of the Los Alamos Scientific Laboratory, has been elected a member of the National Academy of Sciences. The Hill scientist thus becomes one of a select group of 481 scientists who have been voted membership in the organization. Bradbury, who has been chief of the Laboratory since 1945, is a fellow of the American Physical Society, a member of the American Meteorological Society, and a member of the American Geophysical Union.

Archbishop Dedicates New Church

Los Alamos' new Catholic Church opened with special morning dedication ceremonies performed by the Archbishop Edwin V. Byrne of the Santa Fe Diocese. The Rev. Father F. X. Campbell, pastor, expressed his gratitude to "those who have made this church possible." More than 450 were present as the Archbishop extended the blessing to the Immaculate Heart of Mary Church. He prayed for peace to come in the world and said, "You, here in the Atomic City, must work and pray for peace."

Secretary of the Treasury Visits Los Alamos

Secretary of the Treasury John W. Snyder took a quick sun-splashed tour of Los Alamos community facilities and was impressed. The cabinet member and his party were guests of Elmo Morgan, assistant manager of SFO. Local guides for the tour were Edwin Brooks, acting director of community relations for the AEC and Marshall Holloway, LASL official.

what's doing

PUBLIC SWIMMING: High School Pool—Monday through Wednesday, 7:30 to 9 p.m., Saturday and Sunday, 1 to 6 p.m., Adult Swim Club, Sunday, 7 to 9 p.m., Women only, (sponsored by American Red Cross) Saturday, 12 noon to 1 p.m.

SIERRA CLUB: Luncheon meeting at noon, first Tuesday of each month, South Mesa Cafeteria. For information call Brant Calkin, 455-2468, Santa Fe.

RIO GRANDE RIVER RUNNERS: Meetings scheduled for noon, second Friday of each month at South Mesa Cafeteria. For information call Joan Chellis, 662-3836.

INTERNATIONAL FOLK DANCING: Every Tuesday, 8 p.m., Recreation Hall. For information contact Don Liska, 662-3665, or Roy Greiner, 672-9961.

OLD TIMERS SQUARE DANCE CLUB: Second and fourth Saturday of each month, 8:30 p.m., YMCA. For information call Frances Hollinrake, 662-5898.

MOUNTAIN MIXERS SQUARE DANCING CLUB: For information call Mrs. Dee Seitz, 662-7356.
May 1—Canyon School, 8 p.m., Bones Craig, caller.
May 7 and 8—State Festival, Las Cruces, N.M.
May 15—Canyon School, 8 p.m., Bones Craig, caller.

OUTDOOR ASSOCIATION: No charge, open to the public. Contact leaders for information regarding specific hikes.
May 5—Meeting, 7:30 p.m., 100 El Viento, Ed Kmetko, 662-7911.
May 16—Pilar down river, James Fretwell, 662-6477.
May 22—Dolores River, Colo., Walter Green, 672-3203.
May 23—Hike, Ancho Rapids, White Rock Canyon, Cecil Carnes, 672-3593. (To watch Sierra Club river run.)

LOS ALAMOS FILM SOCIETY: 7:30 p.m., May 26, Civic Auditorium. Admission: members—$.50. others. $2. "The Horse's Mouth."

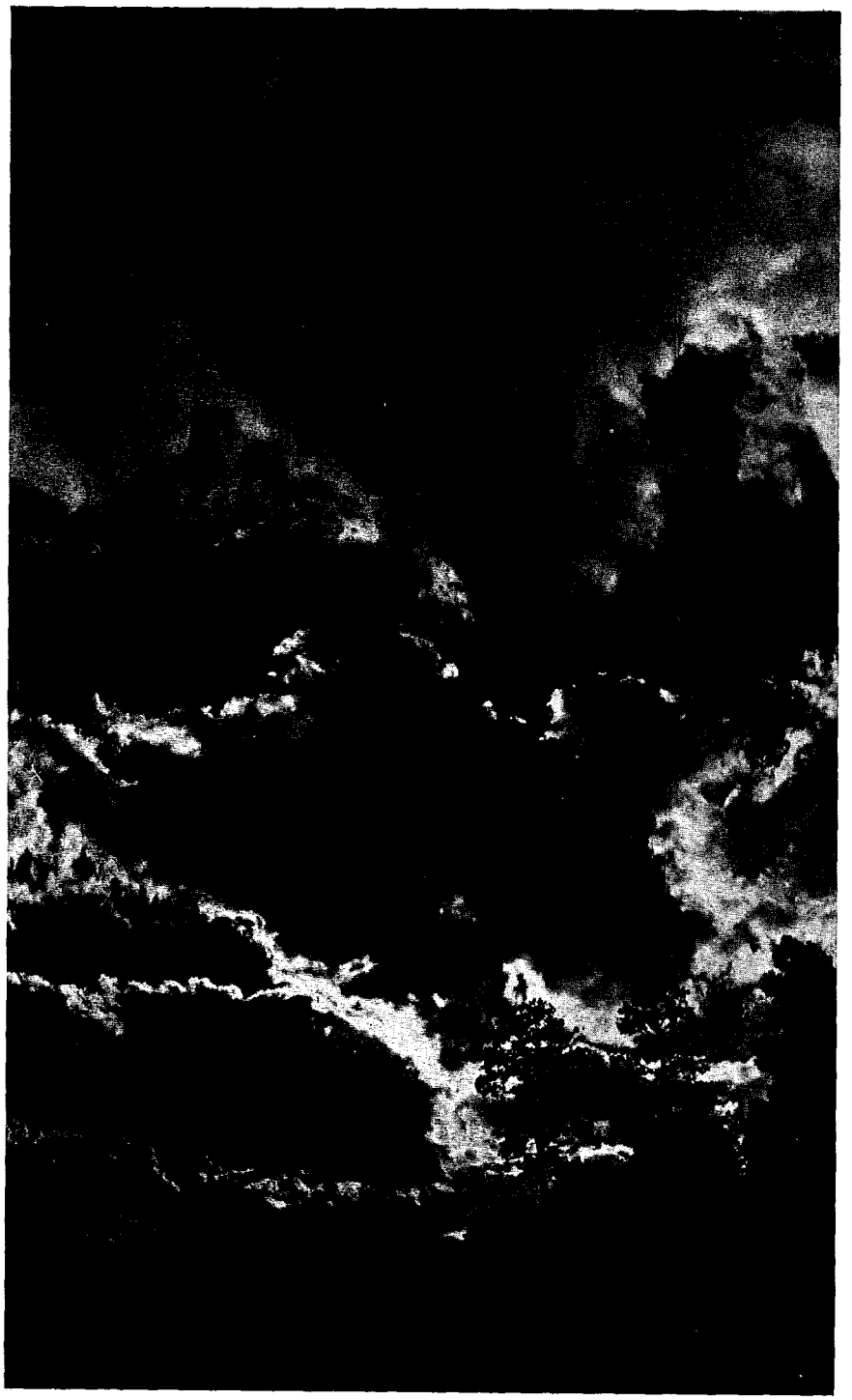
MESA PUBLIC LIBRARY:
Through May 18—Paintings. Mary Lena Burke, Clovis, N.M.
May 19-June 8—Oils, Roger Blake
Through May 19—Tree of decorated eggs, Rita Blake
May 20-June 7—Castings of Pre-Columbian Art, Tony Shearer

NEWCOMERS CLUB: Field Trip to Albuquerque. For information call Sally Jacoby, 662-4862.

LOS ALAMOS CHORAL SOCIETY AND SINFONIETTA OPERA: Benefit, May 16, 2:30 p.m., at the Santa Fe Opera Amphitheatre—Mendelssohn's "Elijah." Adults—$2.50, students—$1. Choral Society-Sinfonietta season tickets will be honored.

The Laboratory was fortunate to have a visiting staff member from Germany in Group P-15 when a delegation from the Federal Republic of Germany Bundestag Science Committee toured Sherwood facilities. Michael Kauffman, second from right, is a member of the staff at the Max Planck Institute for Plasma Physics at Garching, Germany, and has been working in P-15 since March. Members of the Bundestag Science Committee shown with Kauffman in this photograph are Albert Probst, Voker Hauff, and Christain Lenser. (Photo by Henry Ortega)

Henry T. Motz
3187 Woodland
Los Alamos, New Mexico 87544



It was on the road to Pajarito Mountain that ISD-7 Photographer Bill Jack Rodgers photographed these interesting cloud formations about sunset.